

T01D01 – 1.1-3 Moles, Formulas, and Equations Notes

Name

1. 1.1 The mole concept and Avogadro's constant

- a. 1.1.1 Apply the mole concept to substances (2)
 - i. Define a mole and what it's based on:
- b. 1.1.2 Determine the number of particles and the amount of substance (in moles).(3)
 - i. Provide an example for the conversion between mass and moles (and vice versa):
 - ii. Provide an example for the conversion between molecules and moles (and vice versa):
 - iii. Provide an example for the conversion between volume and moles (and vice versa) at STP:

2. 1.2 Formulas

- a. 1.2.1 Define the terms relative atomic mass (A_r) and relative molecular mass (M_r). (1) – taught with topic 02
- b. 1.2.2 Calculate the mass of one mole of a species from its formula. (2)
- c. 1.2.3 Solve problems involving the relationship between the amount of substance in moles, mass and molar mass. (3)
 - i. If 80.0 grams of copper (II) sulfate reacts with an excess of iron, how many grams of copper will be produced?
 - ii. The base calcium hydroxide neutralizes 60.0 g nitric acid, how many g of salt will be produced?
 - iii. 2.0×10^{25} atoms of copper is reacted with an excess of a silver (I) nitrate solution, how many grams of silver are produced?
 - iv. An excess of methane gas combusts in the presence of 1.00 kL of oxygen, what volume of carbon dioxide will be produced at STP?

- d. 1.2.4 Distinguish between the terms empirical formula and molecular formula. (2) - taught with topic 02
- e. 1.2.5 Determine the empirical formula from the percentage composition or from other experimental data. (3) – topic 02
- f. 1.2.6 Determine the molecular formula when given both the empirical formula and experimental data. (3) – topic 02

3. **1.3 Chemical equations**

- a. 1.3.1 Deduce chemical equations when all reactants and products are given. (3)
 - i. What is the law of conservation of mass?

- b. 1.3.2 Identify the mole ratio of any two species in a chemical equation. (2) – covered in 1.2
 - i. What is a mole ratio?

- c. 1.3.3 Apply the state symbols (s), (l), (g) and (aq). (2)
 - i. Why would state symbols be needed in a chemical equation?

 - ii. Why might thermodynamic data be needed in a chemical equation?